Abstract

The Small Trees High Productivity Initiative: Principles and Practice in High Density Orchard Design [†]

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[†] Presented at the third International Tropical Agriculture Conference (TROPAG 2019), Brisbane, Australia, 11–13 November 2019.

Published: 6 March 2020

Abstract: The Small Trees High productivity Initiative aims to address low productivity in avocado, macadamia and mango through intensification. It includes field experiments, genetic and physiological analysis and functional-structural modelling, with a focus on controlling vigour through rootstocks and pruning, manipulating tree architecture, optimising canopy light relations and managing crop load. Trials that compared high density and conventional spacing and training systems were planted in 2014 in Queensland, Australia, for each of the three crops. These trials were also intended to improve our understanding of the key factors driving or limiting yield and quality. Early yield results look promising for the density/training systems we have planted for both mango and macadamia. For example, five years after planting, ‘Keitt’ mango planted at 1250 trees/ha in an espalier training system produced 53.4 tonnes/ha compared to 11.4 tonnes/ha for conventional plantings (208 trees/ha). For the macadamia variety ‘A203’, the high density planting (1000 trees/ha) yielded 5.01 tonnes nut-in-shell/ha; the low density planting (313 trees/ha) yielded 2.97. For ‘Hass’ avocado, however, the yield for central leader shaping and high density planting (1111 trees/ha) was 11.3 tonnes/ha compared to 19.5 tonnes/ha for the conventional shaping and spacing (222 trees/ha). We will discuss factors that may contribute to the relative success and failure of these high density planting systems, including tree structure, canopy volume, vegetative vigour, light interception and distribution, patterns of fruit set and retention, and root area.

Keywords: intensification; macadamia; avocado; mango

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